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COUNTRY East Germany

SUBJECT Tubes Produced and Developed by the HF Telecommunication Plant in Berlin-Oberschoeneweide

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1. In February 1952, the annual 1951 report of the HF Telecommunication Plant at 1-5 Ostendstrasse, Berlin-Oberschoeneweide, the former AEG Oberspree which became a SAG plant in 1946, was discussed [redacted] The total production in 1951 amounted to 78,000,000 eastmarks and this amount was to be doubled in 1952, under the new plant. In early 1951, the HF Plant had a total of 4,500 employees and in late 1951 the plant had 6,400 employees. By late 1952, the plant was scheduled to have 9,500 employees. Two shifts were previously worked only in certain sections of the plant but in 1952 practically all sections of the plant will be working in two shifts in order to utilize more fully the available machinery, which has previously been utilized at less than 50 percent of capacity. The quota fulfillment by the various sections of the plant was 152.5 percent by the Radio Tube Section, 181.9 percent by the Special Tube and Cathode Ray Tube (CR Tubes) Section, 102 percent by the Filament (Molybdenum and Tungsten) Section, 162.2 percent by the Radio Set Section and 39.6 percent by the Experimental Section. The low percentage of quota fulfillment by the Experimental Section was caused by the loss of key technical personnel. The SAG Kabel estimated the total output of the plant at 1932.9 (sic) percent of the quota and bonuses were paid on the basis of this figure. In 1951, 1.7 percent of the tubes delivered, not including failures in T-2 sets delivered to the USSR, were returned by customers.

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2. The production materials used in the OSW and UKW sections of the plant cost 10,159,567 eastmarks in 1950 and 14,373,105 eastmarks in 1951. The general expenses were 2,472,341 eastmarks in 1950 and 2,933,449 eastmarks in 1951. In the Vacuum Tube Section the wages amounted to 2,557,500 eastmarks in 1950 and 5,255,190 eastmarks in 1951. The SAG Kabel appropriated only 1,000,000 eastmarks for investments in 1952, including 600,000 to 800,000 eastmarks for the production of tubes, and an additional 600,000 eastmarks for general repairs. In order to increase production, negotiations were conducted with the Soviets in February 1952, to take over the entire premises of the former Buessing NAG, [redacted] (1)

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[redacted] 3. At a conference held at the plant in mid-February, General Manager Yesakov (fnu) announced the following final production quotas for 1952:

Radio tubes (45,000 are for T-2 TV sets and the rest are for the Soviet Zone of Germany)	2,500,000 tubes
9-inch CR tubes (45,000 are for T-2 TV sets and the rest are for the U.S.S.R.)	135,000 tubes
7-inch CR tubes for the U.S.S.R.	20,000 tubes
Oscillograph tubes (2 - Ray tubes similar to type AEG 2068 B)	1,000 tubes
Various oscillograph tubes for the Soviet Zone of Germany	1,000 tubes
Metal-ceramic tubes (50,000 are for the U.S.S.R. and 5,000 are for the Sachsenwerk in Radeberg)	55,000 tubes
Sun lamp elements (Hoehensonnen-Leuchtkoerper) PRK 2 (200 watts)	12,000 units
Sun lamp elements PRK 4 (120 watts) (for sun lamp treatment in Soviet mines and districts lacking sunshine)	5,000 units
NHRT light tubes (Leuchtroehren)	10,000 tubes

The production schedules for 1953 and 1954 were as follows:

	1953	1954
Radio tubes	(not yet established)	
Metal-ceramic (MK) tubes	150,000	500,000
9-inch CR tubes	250,000	500,000
7-inch CR tubes	50,000	50,000
Oscillographs tubes (according to pattern)	50,000	50,000

General Manager Yesakov further stated that two samples and technical specifications for the oscillograph tubes, which are similar to the AEG 2068 B type, had arrived from the U.S.S.R. He said that workshops and machinery would be planned on the basis of the production scheduled for 1953 and 1954. (2)

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5. Data extracted in February 1952 from a report forwarded to Dr. Schiller, concerning the productive capacity for metal-ceramic (MK) tubes, indicated that the monthly production of the welding machines for MK-tubes, working two shifts, was 7,500 items. This capacity cannot be increased without new machinery. The productive capacity for cathodes for MK-tubes was 9,000 items per month. The capacity of the special tube pump which was also used in the production of MK-tubes was 15,000 pieces per month. The capacity of the test field was 7,500 items per month. In order to increase the capacity of the HF Plant, test transmitters (Pruefsender) were manufactured by SFEM.

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6. Starting in late February 1952, the new Soviet plant management attempted to reduce the number of faulty CR tubes by improving methods and by issuing new acceptance specifications. Also, the settling process (Setteltechnik) was changed to the rapid settling method (Schnellabsetzmethode), which reduced the time required for this process to 90 minutes. The quality of the grids, especially their resistance against burning out, was considerably improved by this procedure. Not only the cathode components, but also other components to be built-in, were vacuum annealed to achieve a longer service life.

7. The 1950 development project of the HF plant included the development of carrier frequency transmission installations and accessories (Zusatzeinrichtung) for carrier frequency telephones for the power generating industry; development of coupling equipment for EWT, development of EWT one-side band sets (Einseitenbandgeraeten), remote control devices, development of a 12 (20)-channel carrier frequency telephone system for no-load cables (unbelastete Kabelleitungen); conversion of already laid cables to the U-system, development and construction of test equipment for audio-frequency long distance selectors (Tonfrequenz Fernwahl), development of an audio-frequency call transformer (Rufumsetzers), development of a teletype using sheet paper (Blattschreiber) and a simplified teletype machine, work on impulse code modulation based on the article "An Experimental Multi-channel Pulse-Code Modulation System of High Quality" by L.A. Meachem and E. Petersen; and development of a working calibration circuit (Arbeitserchkreis). Development projects for 1951 included work on remote control installations, a coupling filter for EWT equipment, an all purpose amplifier, transmission level recording equipment (Pegelbildgeraet), radio amplifier frame (Rundfunkverstaerkergestell), superheterodyne adapter (Ueberlagerungsvorsatz), a sound voltmeter (Geraeuschspannungsmesser), a voltage analyzer for frequency analysis and impulse code modulation. The laboratory for oscillation quartzes, which was closed after several experts went to West Germany, was taken over in June 1951 by Dr. Bauer (fnu). A search was being made for crystal grinders in order to start production in this laboratory. (4)

25X1 [redacted] a conference concerning the production of oscillation quartzes was held at the HF plant on 14 June 1951. Those present at the conference were R. Mueller, manager of the HF plant; Lorentz (fnu), managing engineer of the HF plant; Dr. Eckart (fnu), chief of the HF experimental plant; Graduate Engineer Fischer (fnu), plant manager of the VEB Carl Zeiss; and a high-ranking police official who announced that orders for about 100,000 oscillation quartzes would be placed in the near future. It was stated that despite the departure of Dr. Weihe (fnu) and Dr. Gerber (fnu) the Zeiss firm still had a number of experts who would be able to maintain mass production of oscillation quartzes. Since two of the HF plant specialists on tuning (Abstimmen) oscillation quartzes went to West Germany in mid-1951, it was arranged that the Zeiss firm would also tune the quartzes. The equipment required for this work was to be supplied to the Zeiss firm by the HF Plant. Another topic discussed at this conference was the shortage of quartz crystals. The Zeiss firm had received 87 kg of quartz [redacted] 25X1

9. The HF experimental laboratory was building equipment worth 80,000 eastmarks for the Zeiss firm. This equipment was to be used for drilling holes in drawing diamonds by the use of electronic probes (Electronensonde). Tests on small glass plates were said to have been successful.

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[redacted] RCA (Radio Corporation of America) tubes had been the principal item produced by the Tube Section. [redacted] 25X1 after the experimental development of the tubes was completed, all documents, drawings, production specifications and samples were compiled by the section which had worked on the development and were then prepared by the Publication Section to be sent to the U.S.S.R. [redacted] all tubes had 25X1 to be exact duplicates of, and interchangeable with, the patterns, both mechanically and electrically and that minor deviations from the standard design were permissable only if all the electric qualities were retained. Because of their enormous requirements, the Soviets insisted on a permanent increase in the production of certain types. For example, they demanded a monthly production of 3,500 6AC7 type tubes and 1,000 6 AG7 type tubes. The return of types already sent to Moscow was also discussed. The adviser on glass tubes was Major Cherepnin (fnu), a graduate engineer and an expert on tubes who was familiar with the RCA methods and had all the necessary RCA documents. His superior was Major Wildgrube (fnu) who came from one of the Baltic countries and was relieved in early 1949, allegedly because of profiteering. His interpreter and secretary was Captain Voronkov (fnu).

11. The development orders submitted in 1951 were estimated at 9,800,000 eastmarks. A total of 127 development orders, which were called planning-subject tasks (Themenplanaufgaben), were received in 1952. Of this total, 54 originated with the Soviets.

12. Further development of various RCA-type tubes for TV purposes was to be completed by late 1952. Orders received prior to early February included the development of the 6J6, 6 AL 5, 6AG5, 6X4, and 6AK 5 types.

13. In February 1952, laboratory samples of the L-cathode were used in making tests to establish the permissible variations. The L-cathode was also thoroughly tested and completed for production at the same time. A test cathode for the LD 12, which was subjected to a load of 200 milliamperes achieved a service life of 1,500 hours under these tests. Because the tungsten in the cathode vaporized extensively, the tube-researchers concluded that insulation defects resulting from the vaporization, as well precipitation on the walls of the tubes, would possibly result in variations of capacity and the so-called S-effect, and therefore believed that it might be necessary to redesign the tubes. It was planned to equip metal-ceramic tubes and later, high-load rectifier tubes, such as those used in electronic controls, with L-cathodes. A specialist attempted to sinter rhenium by a process similar to that used for tungsten. (6)

14. The delivery of stabilizers, which would work even in moving vehicles, was urgently demanded by the Sachsenwerk in Radeberg. Of the requirements to be met, stabilizers with glass bulbs were refused and the development of metallic stabilizers was urged. (7)

15. The HBO-1000 type lamp, a water-cooled, extreme pressure, point light tube (Hoechstdruck-Punktlicht-Lampe), with an inner bulb of quartz and an outer bulb of hardened glass, was not yet in production in early 1952. The development of this lamp was ordered by the planning officials of the U.S.S.R. and the Soviet Zone of Germany in 1950. It was initiated by advisers Ihlen (fnu) and Kopeck (fnu). The development was registered at the plant as a Soviet project which, however, was financed by the German Government. In 1951, eight persons worked exclusively on the development of this lamp. A service life of about 500 hours was attained. Six samples were delivered to the State Planning Commission and six more were sent to the Film Development Institute in Babelsberg. To date, no preparations for the production of this lamp have been made. The necessary investments were estimated at 40,000 to 50,000 eastmarks. A total of 100 lamps of HBO-500-type were produced per month.

16. Dr. Birgel (fnu), director of the Semi-Conductor Cost Department (Kostenstelle-Halbleiter) was responsible for the development of transistor (Transitoren).

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He tried to develop an n-p-n junction-germanium-**transistor** but failed to discover the correct impurity degree of germanium. In January 1952, the plant therefore ordered a study of the technical literature on semi-conductors which was available at the America House.

17. The HF Plant received an order to construct 20 television sets of the latest design for the U.S.S.R. (8)

18. Zero-slot (Nullschlitz) magnetron tubes 2332 A and 2332 B were manufactured as components of the field-intensity measuring instruments which were being developed and produced at the plant. Magnetron LMS 1000, of which a specified number was to be built, was developed by Steimel (fnu), Fritz (fnu) and Vinzelberg (fnu) in 1944. (9)

19. The Soviet planning order for the development of a 2-ray CR oscillograph, with an amplifier for 20 cycles to 50 kcs and with a writing speed of 50 km/s, was completed in early 1952.

20. The following directions concerning the handling of Soviet orders were issued: The preliminary drafts of these orders must be submitted to the Soviet management of the plant concerned about three months before the beginning of each calendar year. The actual orders are to be placed before late February and all specifications concerning the order must be submitted at the same time. The Soviet orders are not considered as being completed until the final reports were written in German. These reports were translated in Moscow. These reports were translated into Russian at the plant, only in cases where it was absolutely certain that production of the items concerned was to be carried out in Soviet Zone plants. Questions by the plants concerning the Soviet orders were answered by Moscow within about two weeks if the questions concerned development work. Questions concerning production, such as requests for permission to use substitute materials or to change the acceptance specifications, were answered in about four weeks. If the plant refused orders because of insufficient capacity, the orders enabling the plant to increase their capacity were not received for at least eight weeks after the refusal.

21. In February 1952, general manager Kosakov issued an order that no export orders could be refused because of insufficient capacity. He especially insisted on increased exports of water-cooled transmitter tubes to satellite countries. (10)

22. The Hescho-Kahla Plant was ordered to produce metal ceramics for the 1952 metal-ceramic (MK) tube program. Luminous material (Leuchtstoff) for the 1952 CR tube production program was supplied by the RFT Leuchtstoffwerk in Bad Liebenstein. However, this plant was only able to supply half of the required material in granulated form and the remainder was settling material (settelbarer Leuchtstoff). During the period from 25 to 29 February, about 950 kg of P 2 iron was purchased by the plant [redacted] 25X1 In 1951, P 2 iron was also recei[redacted] Iron and Steelworks, Ltd., in Hickede. In an attempt to alleviate the permanent shortage of material, the rolling mills in Auerhammer were allegedly ordered by the Ministry to produce P 2 iron (11)

23. In 1951, it was still possible to equip the F 50 tube with heaters of the LS 3 Telefunken tube, which were still available. The plant production of heaters resulted in considerable waste. The insulating mass became brittle during the sintering process and the tungsten filaments were of poor quality because part of the tungsten acid had to be obtained from impure tungsten waste. The RFT Berliner Gluehlampenwerk (Incandescent Lamp Works) was faced with the same difficulties. Attempts were made to obtain tungsten filaments from Austria via Switzerland or Sweden. The RFT Plant in Erfurt allegedly received **tungsten** filaments in this manner.

24. Fireproof tubes for temperatures up to 1,600 degrees centigrade, required for annealing ovens used in the production of tubes, were supplied by the Haldenwanger firm in Duesseldorf [redacted] 25X1 Tubes manufactured in the Soviet Zone of Germany by the Neuhaus Porcelain Works in Neuhaus-Schierschnitz under the name of Pollit or Pyrolan, were usable only at temperatures not exceeding 1,400 degrees centigrade. The Hescho-Kahla Plant was therefore ordered to develop fireproof tubes. (12)

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27. In February 1952, two Soviet engineers arrived at the plant to obtain information. Isakov (fnu) inspected the radio tube manufacturing section, Griorgieff (fnu) was interested in the production of CR tubes and gave advice on production methods, thus indicating that he was an expert. The Soviets were not interested in experimental work. The plant was also inspected by visitors from China, Hungary and Poland, in groups of 5 to 7. By order of the plant management, these visitors had free access to all sections of the plant and were given any information they wanted but they were not given any documents. (15)

28. Copies were made of a letter from the technical planning section, dated 25 January 1952, concerning the increase in the production per worker in 1951 as compared with December 1950, and of a letter, dated 28 January 1952, from the management of the experimental station to Director Reimann (fnu) and Director Mueller (fnu). (16)

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